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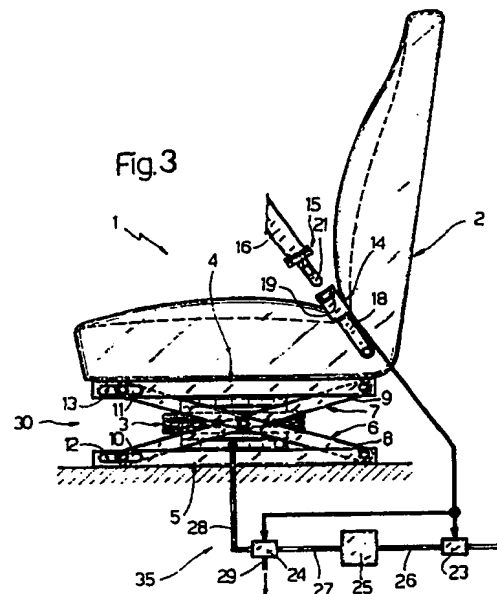
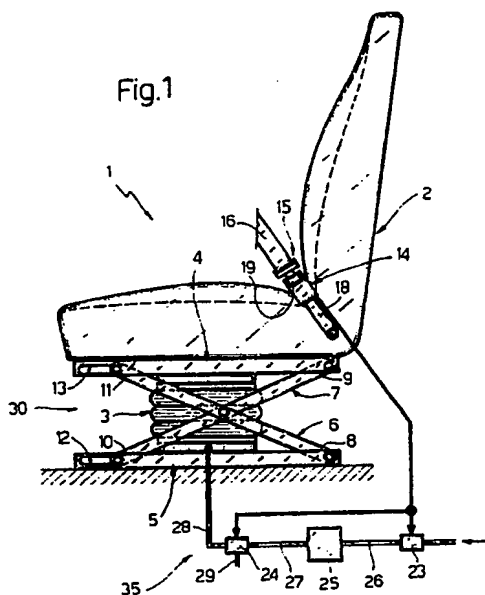
94 Device preventing a failure to connect the safety belt of an industrial vehicle.

97 A device preventing a failure to connect the safety belt of an industrial vehicle in which the position of the vehicle's driving seat (2) is adjusted between a first correct operational position for driving and a second operational position unsuitable for driving by a pneumatic system (35) controlled by a

sensor (22) actuated when the safety belt (16) is buckled.

The pneumatic system (35) positions the seat (2) in the first position only when the safety belt (16) is correctly connected

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# DEVICE PREVENTING A FAILURE TO CONNECT THE SAFETY BELT OF AN INDUSTRIAL VEHICLE

The present invention relates to a device preventing a failure to connect the safety belt of an industrial vehicle.

As is known, recent regulations have made it compulsory for almost all drivers to use safety belts. Despite this legislation some drivers fail to connect their safety belts through forgetfulness or negligence. Optical or acoustic warning devices are known which inform the driver that the safety belt has not been buckled.

Not enough attention is always paid to these known devices and for this reason their use is normally not very effective.

The object of the present invention is to provide a safety device which is actuated whenever the safety belt is not connected so as to force the driver of the vehicle to connect the belt.

The present invention provides a device preventing a failure to connect a safety belt of an industrial vehicle characterized in that it comprises actuator means adapted to be disposed below a seat of the industrial vehicle so as to adjust the position of this seat between a first correct operational position for driving and a second operational position unsuitable for driving, sensor means adapted to be installed in the belt and to emit a signal as a function of the correct connection of the safety belt and means for regulating the position of these actuator means, these regulation means being controlled by the sensor means in order to position the seat in the first operational position only when the safety belt is correctly connected.

The invention is described below with reference to the attached drawings which show a non-limiting embodiment thereof and in which:

Fig. 1 shows, partly in side view and partly in diagrammatic form, a safety system according to the present invention;

Fig. 2 is a top view of a detail of Fig. 1;

Fig. 3 shows, partly in side view and partly in diagrammatic form, the safety system shown in Fig. 1 in a further position of use.

In the drawings, in particular Figs. 1 and 3, a prevention device of the present invention is shown overall by 1 and controls the position of a seat 2 of a vehicle, preferably an industrial vehicle.

The device 1 comprises an air spring 3 located in use below the seat 2 so as to adjust its position between a first operational position (Fig. 1) suitable for driving and a second operational position (Fig. 3) unsuitable for driving. The device 1 is also provided with a support unit 30 for the seat 2 essentially formed by horizontal guides 4, 5 adapted to be secured to the seat 2 and the floor of the vehicle in question respectively. The opposite ends

of the guides 4, 5 are connected by respective arms 6, 7 disposed in the shape of an X and hinged at their centre.

The arms 6 and 7 have first ends 8 and 9 hinged on the guides 5 and 4 and second ends 10 and 11 which slide in openings 12 and 13 provided in the guides 5 and 4 respectively.

A detachable fastening 14 for a safety belt is disposed in use in a position adjacent to the seat 2; a buckle 15, connected to the web of a safety belt 16, is snap-locked in this fastening.

The detachable fastening 14 comprises in particular (see Fig. 2) a body 17 shaped substantially as a parallelepiped which is connected to a projection 18 anchoring it for example to the floor of the vehicle and has a push-button 19 for the unbuckling of the safety belt.

The body 17 is provided internally with a slot 20 in which a tongue 21 of the buckle 15 is snap-locked.

The device 1 comprises a sensor 22 (for instance a conventional microswitch) adapted to be supported by the body 17 and to generate a signal as a function of the correct buckling of the tongue 21 into the slot 20.

As shown in Figs. 1 and 3, the device is provided with a pneumatic system 35 (shown diagrammatically) actuating the air, spring 3.

The system 35 comprises an electric interception valve 23 and a three-way electric valve 24 which are controlled by electrical signals from the sensor 22. The pneumatic system also comprises a pressure regulation device 25 and can advantageously be connected to a compressed air source (not shown) provided in the vehicle.

In use, the electric valve 23 has its inlet connected to the compressed air source while its outlet communicates with the inlet of the device 25 via the duct 26. The outlet of the device 25 is connected, via the duct 27, to the inlet of the electric valve 24. The electric valve 24 has two outlets: the first outlet is connected to the air spring 23, via the duct 28, and the second outlet is connected to a discharge duct 29.

Fig. 1 shows the operation of the device 1 when the safety belt is connected.

In this operating mode, the tongue 21 is inserted within the slot 20 and the sensor 22 is activated. The sensor 22 generates electrical signals which, in a conventional manner, drive the electric valves 23 and 24. The electric valve 23 is open and the electric valve 24 brings the duct 27 into communication with the duct 28. In this way the compressed air, after passing through the electric valve 23, flows through the duct 28, the device

25 and the ducts 27 and 28 reaching the air spring 3. The air spring 3 expands and the seat 2 is raised reaching an operational position from which the vehicle can be correctly driven.

Fig. 3 shows the operation of the device 1 when the safety belt is not connected.

In this operating mode, the tongue 21 is not inserted in the slot 20 and the sensor 22 is not activated. The sensor 22 generates other electrical signals which drive the electric valves 23 and 24 in an opposite manner to that described above. The electric valve 23 is closed and the electric valve 24 brings the duct 28 into communication with the duct 29. In this way, the compressed air cannot flow into the duct 26 since the electric valve 23 is closed. The compressed air in the air spring 3 flows out through the ducts 28 and 29 and is externally discharged. The air spring consequently deflates and the seat 2 is lowered rearwardly reaching an operational position, shown in Fig. 3, from which driving is impossible.

The above description shows that the prevention device of the present invention is more efficient than the known devices: the driver is forced to attach the safety belt in order to position the seat in the correct position and therefore to be able to drive.

The prevention device provides a further important advantage in the particular case of industrial vehicles. In these vehicles the seat is in a fairly high position in the driving cabin which makes it difficult for the driver to get onto the driving seat. As described and illustrated, particularly in Fig. 3, the air spring 3 is deflated whenever the safety belt is unbuckled; this means that the seat is lowered rearwardly making it easier for the driver to get on and off the seat.

It is also evident that modifications and variants can be made to the construction of the prevention device without departing from the scope of the invention. The air spring 3 could in particular be replaced by a plurality of air springs or by equivalent actuator means (for instance fluid-operated or electro-mechanical actuator means). The same applies to the sensor 22 and the various components of the pneumatic system 35.

## Claims

1. A device preventing a failure to connect a safety belt (16) of an industrial vehicle, characterized in that it comprises actuator means (3) adapted to be disposed below a seat (2) of the industrial vehicle so as to adjust the position of this seat (2) between a first correct operational position for driving and a second operational position unsuitable for driving, sensor means (22) adapted to be installed in the

belt (16) and to emit a signal as a function of the correct connection of the safety belt (16) and means (35) for regulating the position of these actuator means (3), these regulation means (35) being controlled by the sensor means (22) in order to position the seat (2) in the first operational position only when the safety belt is correctly connected.

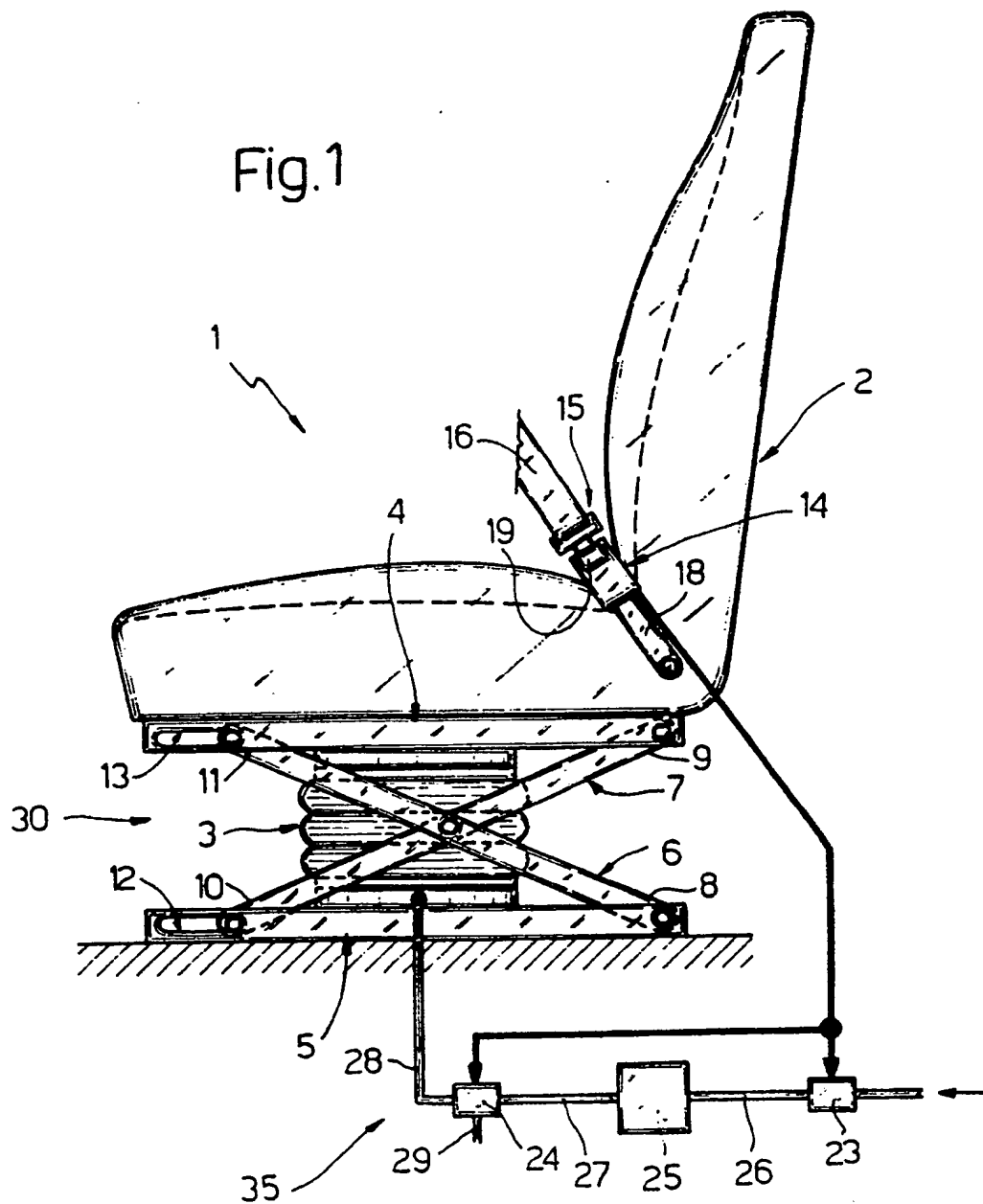
2. A device as claimed in claim 1, characterized in that the actuator means comprise at least one air spring (3).

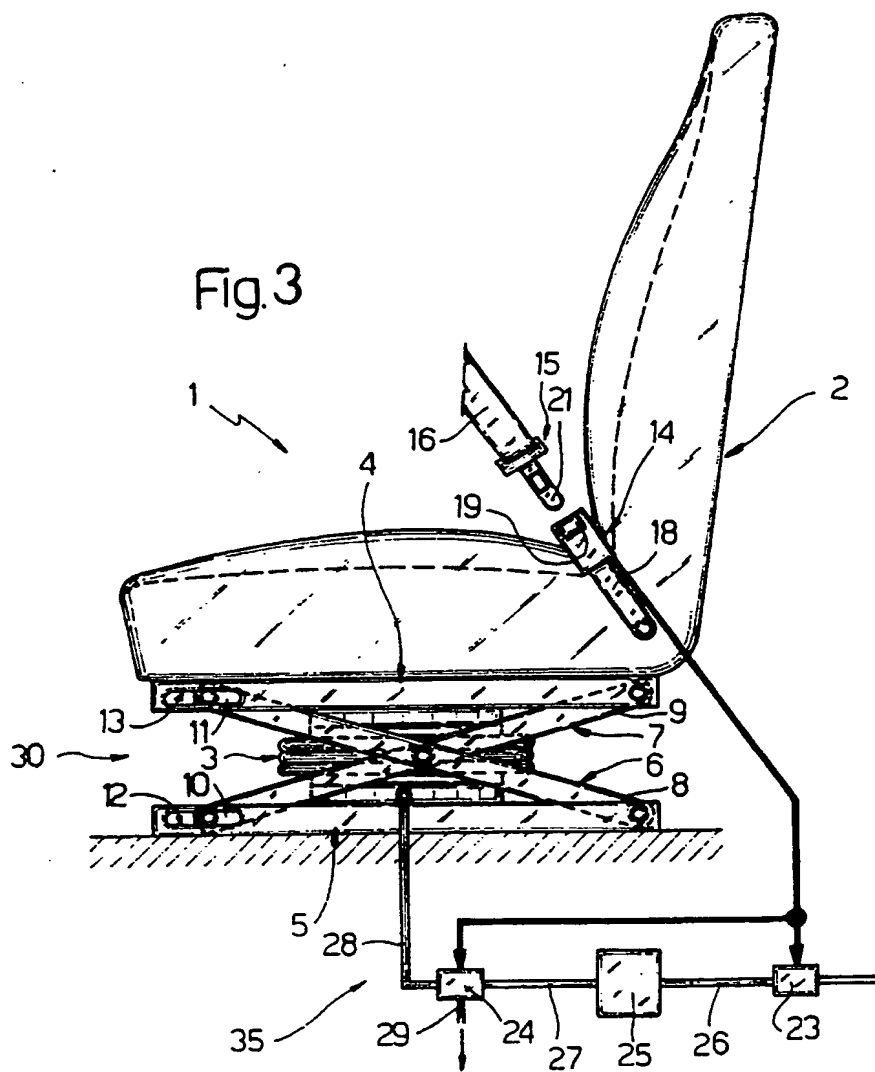
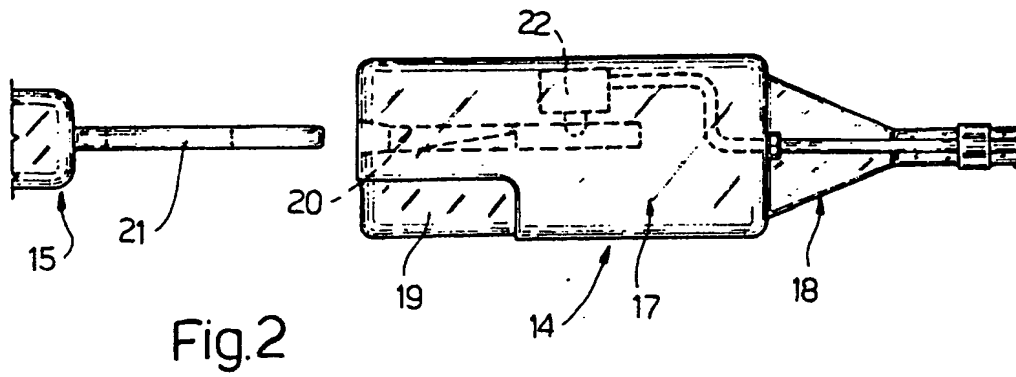
3. A device as claimed in claims 1 or 2, in which the safety belt (16) is provided with a fastening (14), characterized in that the sensor means (22) comprise at least sensor (22) adapted to be supported by this fastening (14).

4. A device as claimed in claim 3, characterized in that the sensor (22) is a microswitch and in that this microswitch (22) is actuated by a tongue (21) of the safety belt (16).

5. A device as claimed in claims 3 or 4 characterized in that the regulation means (35) comprise at least one electric interception valve (23) and a three-way electric valve (24), these valves (23, 24) being controlled by electrical signals from the sensor (22), the inlet of the electric interception valve (24) being adapted to be connected to a compressed air source and its outlet being connected to the inlet of the three-way electric valve (24), one way of the three-way electric valve being connected to the air spring (3) and a further way being connected to a discharge duct.

Fig.1







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## EUROPEAN SEARCH REPORT

Application Number

EP 90 11 7663

DOCUMENTS CONSIDERED TO BE RELEVANT					
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)		
A	GB-A-1 589 401 (NATIONAL DISTILLERS AND CHEMICAL CORPORATION) * page 1, line 92 - page 2, line 85; figures 1, 2 * -- --	1,2,5	B 60 R 22/48		
A	US-A-3 781 497 (R. L. STEPHESON AND Y. S. LOOMBA) * column 5, line 35 - column 6, line 2; figures 4, 5 * -- -- -- --	3,4			
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)		
			B 60 R B 60 N E 02 F		
The present search report has been drawn up for all claims					
Place of search The Hague		Date of completion of search 17 December 90	Examiner CHLOSTA P.		
<table border="0"><tr><td><b>CATEGORY OF CITED DOCUMENTS</b> X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention</td><td>E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons ----- &amp;: member of the same patent family, corresponding document</td></tr></table>				<b>CATEGORY OF CITED DOCUMENTS</b> X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention	E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons ----- &: member of the same patent family, corresponding document
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